# WIRELESS, ENERGY HARVESTER WITH MODULAR SENSOR SYSTEM

## Cross-Reference to Related Application

[0001] This application is a continuation-in-part of International Application No. PCT/US20/65282, filed December 16, 2020, which claims the benefit of U.S. Provisional Application No. 62/948,709, filed December 16, 2019, which are incorporated herein by reference in its entirety.

## Summary of the Invention

[0002] The present disclosure generally relates to modular sensor systems comprising at least one energy harvesting component.

[0003] The present disclosure is directed to modular sensor systems, which allow the user to provide customized sensor solutions. The disclosed system allows for easier custom sensor deployment through the use of a wireless system that contains wireless energy harvesting and wireless communication of sensor data. The system comprises modules to expand the sensor capability, allowing a potentially unlimited number of sensors to be added modularly. In addition, each module can contain any of a plurality of sensors, energy harvesters, energy storage devices, and/or wireless radios. The energy harvesters according to the present disclosure can increase the available energy for the device and/or extend the lifetime of the device over other prior art solutions, such as using batteries, capacitors, and/or supercapacitors.

[0004] These advantages, for example, promote more frequent or constant communication, and/or enable powering more electronics that use higher amounts of energy. In particular, the energy harvesters according to the present disclosure can be used to power high-power sensors and electronics. As used herein, high-power sensors and electronics refer to self-powered devices having a time-averaged power

sensing, modular power harvesting and/or radio device, building/home monitoring, tamper resistant monitoring, alert systems, automation, automotive, and building integrated photovoltaics.

[0007] According to an aspect of the present invention, there is provided a modular sensor system comprising a plurality of modules, the plurality of modules comprising one or more sensors, wherein at least one of the modules contain one or more high-power sensors or electronics, one or more energy harvesters, one or more energy storage devices, one or more wireless radios, and one or more electronics devices, wherein the one or more energy harvesters comprise a photovoltaic cell; and one or more blind-mate connectors contained within each of the plurality of modules, wherein the one or more blind-mate connectors comprise an electrical connector to transmit power and/or data and configured to connect two modules of the plurality of modules together.

[0008] In other embodiments, the present disclosure is directed to a modular sensor system comprising a plurality of modules, the plurality of modules comprising one or more sensors, one or more energy harvesters, one or more wireless radios, and one or more electronics devices, wherein the one or more energy harvesters comprise a photovoltaic cell; and one or more blind-mate connectors contained within each of the plurality of modules, wherein the one or more blind-mate connectors comprise an electrical connector to transmit power and/or data and configured to connect two modules of the plurality of modules together.

[0009] Other embodiments of the present disclosure are set forth below.

[0010] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.